PROGRAMME OUTCOMES AND COURSE OUTCOMES

2023 – 2024

NAME OF THE PROGRAMME: PG CHEMISTRY **PROGRAMME CODE: PSCH**

Programme Outcomes:

PO1	Firm hold and sound footing in theoretical and practical aspects of Chemistry
PO2	An overall comprehensive and an in-depth knowledge and equip learners to possess global competency
PO3	Diversified branches with deep rooting cultivate research aptitude that leads to innovative findings
PO4	Informative but applicationoriented inputs
PO5	Enhanced chances to take up careers in industries and other pivotal sector.
PO6	Rigorous training to tackle challenges in the academic and societal need based fields
PO7	Opportunity to be exposed to the current emerging trends in the field of Chemistry through activities such as workshops, seminars and projects.

Course Outcomes:

Course Code	Course Title	Course Outcomes
23PG1C1	ORGANIC REACTION MECHANISM-I	CO1: To recall the basic principles of organic chemistry. CO2: To understand the formation and detection of reaction intermediates of organic reactions. CO3: To predict the reaction mechanism of organic reactions and stereochemistry of organic compounds. CO4: To apply the principles of kinetic and non-kinetic methods to determine the mechanism of reactions. CO5: To design and synthesize new organic compound by correlating the stereochemistry of organic compounds.
23PG1C2	STRUCTURE AND BONDING IN INORGANIC COMPOUNDS	CO1: To compare the stabilities various compounds CO2: To describe the theories of compounds Of ionic crystals CO3: To investigate the structures of complexes using by XRD techniques CO4: To possess a thorough understanding of electronic spectra of complexes by SEM and TEM CO5: To gain knowledge of Defect in crystals

23PG1C3	ORGANIC CHEMISTRY PRACTICALS	CO1: To be skilled in the separation of binary organic mixtures CO2: To gain knowledge on the skills of doing micro level analysis CO3: To know the methods of qualitative analysis of organic compounds CO4: To learn about the preparation of suitable derivative of the organic functional groups CO5: To prepare organic compounds.
23PG1CE1	PHARMACEUTICAL CHEMISTRY	CO1: To identify the suitable drugs for various diseases. CO2: To apply the principles of various drug action and drug design. CO3: To acquire the knowledge on product development based on SAR. CO4: To apply the knowledge on applications of computers in chemistry. CO5: To synthesize new drugs after understanding the concepts SAR.
23PG1CE2	NANOMATERIALS AND NANOTECHNOLOGY	CO1: To explain methods of fabricating nanostructures CO2: To relate the unique properties of metallic nanoparticles with other nanomaterials. CO3: To discuss the electrical and magnetic properties of nano

		materials. CO4: To distinguish various types of nanosensors and carbon nanotubes. CO5: To explain Nanocomposites and core/shell nanoparticles.
23PG1CE3	ELECTROCHEMISTRY	CO1: To understand the behaviour of electrolytes in solution and compare the structures of electrical double layer of different models. CO2: To predict the kinetics of electrode reactions applying Butler-Volmer and Tafel equations CO3: To study different thermodynamic mechanism of corrosion, CO4: To discuss the theories of electrolytes, electrical double layer, electrodic and activity coefficient of electrolytes CO5: To have knowledge on storage devices and electrochemical reaction mechanism.
23PG1CE4	MOLECULAR SPECTROSCOPY	CO1: To understand the importance of rotational and Raman spectroscopy CO2: To apply the vibrational spectroscopic techniques to diatomic and polyatomic molecules CO3: To evaluate different electronic spectra of simple molecules using electronic spectroscopy CO4: To outline the NMR, 13C NMR, 2D NMR – COSY, NOESY,

		Introduction to 31P, 19F NMR and ESR spectroscopic techniques. CO5: To develop the knowledge on principle, instrumentation and structural elucidation of simple molecules using Mass Spectrometry, EPR and Mossbauer Spectroscopy techniques
23PG1CAE	CHEMISTRY IN CONSUMER PRODUCTS (EDC)	CO1: To understanding the preparation of cosmetics CO2: To know the preparation of some personal care products like soap and shampoos CO3: To explore the preparation methods of house hold products CO4: To acquire hands-on training on the preparation of the house hold products. CO5: To get hands-on training on the preparation of some common products.
23PG2C4	ORGANIC REACTION MECHANISM-II	CO1: To understand the concept of aromaticity in benzenoid, non-benzenoid, heterocyclic and annulene compounds. CO2: To understand the mechanism involved in various types of organic reactions with evidences. CO3: To understand the applications of synthetically important reagents. CO4: To correlate the reactivity between aliphatic and aromatic compounds.

		CO5: To design synthetic routes for synthetically used organic reactions
23PG2C5	PHYSICAL CHEMISTRY-I	CO1: To determine partial molar quantities and assess partition functions. CO2: To categorize and compare various partition functions - translational, rotational, vibrational and electronic partition functions and distinguish various Statistics CO3: To deduce Onsagar's theory and its validity. CO4: To deduce the rate of chemical reactions to understand mechanism involved in reactions. CO5: To examine the kinetics of complex and fast reactions.
23PG2C6	INORGANIC CHEMISTRY PRACTICALS	CO1: To describe the principle and procedure of quantitative analysis CO2: To identify thesuitable complexing agents for the given metal ions CO3: To draw the structure of various ligands and complexes CO4: To distinguish volumetric analysis and gravimetic analysis CO5: To apply the expressions of various terms in calculations

23PG2CE5	MEDICINAL CHEMISTRY	CO1: To predict a drugs properties based on its structure. CO2: To describe the factors that affect its absorption, distribution, metabolism, and excretion, and hence the considerations to be made in drug design. CO3: To explain the relationship between drug's chemical structure and its therapeutic properties. CO4: To get knowledge of different theories of drug actions at molecular level. CO5: To identify different targets for the development of new drugs for the treatment of infectious and GIT.
23PG2CE6	GREEN CHEMISTRY	CO1: To recall the basic chemical techniques used in conventional industrial preparations and in green innovations CO2: To understand the various techniques used in chemical industries and in laboratory CO3: To compare the advantages of organic reactions assisted by renewable energy sources and non-renewable energy sources CO4: To apply the principles of PTC, ionic liquid, microwave and ultrasonic assisted organic synthesis. CO5: To design and synthesize new organic compounds by green methods

23PG2CE7	BIO INORGANIC CHEMISTRY	CO1: The students will be able to analyses trace elements. CO2: Students will be able to explain the biological redox systems. CO3: Students will gain skill in analyzing the toxicity in metals. CO4: Students will have experience in diagnosis. CO5: Learn about the nitrogen fixation and photosynthetic mechanism.
23PG2CE8	MATERIAL SCIENCE	CO1: To distinguish between bulk material and nanomaterials CO2: To choose the suitable synythetic methods to prepare particular nanomaterials CO3: To interpret the structure of nanomaterials using various characterisation techniques CO4: To catagorize and identify thedifferent types Carbon nano structures CO5: To summarise the uses of nanomaterials in various fields
23PG2CSE1	CHEMISTRY IN EVERYDAY LIFE (EDC)	CO1: To analyse the buffering capacity of soil, p H, cation exchange capacity, nutrient availability of soil, fertility status of soil. CO2: To analyze the pH of water, hardness of water and acquire knowledge of advanced water purification techniques (and water treatment)

		CO3: To identify different types of food colour,additives and food adulterants CO4: To learn the ingredients required for the preparation of the various types of shampoos,skin powder and nail polish CO5: To analyze and Detect the presence of adulderants in oils and to compare the physical and chemical refining of oils.
19PG3C11	ORGANIC CHEMISTY-III	CO1: To acquire a complete knowledge of the basic principles of 1H-NMR, 13C-NMR and Mass spectroscopy CO2: To be acquainted with complete knowledge of photochemistry of ketone &cyclo addition reactions and to develop an understanding of the significance of the number, and splitting of signals in NMR CO3: To be competent to assign structures to simple molecules on the basis of nuclear magnetic resonance spectra CO4: To distinguish the similarities and differences of Pericyclic reactions and Cyclo addition and sigmatropic reactions CO5: To apply the Spectral concepts to solve the problems, to elucidate the structures of simple organic compounds using the data from all the spectral techniques
19PG3C12	PHYSICAL CHEMISTRY-III	CO1: To learn about symmetry elements and symmetry operations, the point groups and character table CO2: To Describe the selection rule for infrared-active and Raman

		active transitions, electronic transitions CO3: To analyse the hybridization of given compounds and to apply HMO theory to Ethylene and some conjugated systems CO4: To Classify of surface active agents, Polymers, and to derive Gibbs adsorption and BET isotherms CO5: To explain the kinetics of vinyl, cationic and anionic polymerizations and to determine the mass of polymers.
19PG3C13	GREEN CHEMISTRY	CO1: To know about the alternative feedstock and to study about the process and advantages of alternative materials CO2: To get familiarise about the green chemistry technology CO3: To understand the need of alternative energy sources CO4: To learn different types of renewable energy sources CO5: Toacquire knowledge about the greener techniques in industries
19PG3CE1	MATERIAL CHEMISTRY	CO1: To gain knowledge about the basic principles of nanochemistry and classification of nanomaterials. CO2: To describe several synthesis of inorganic nanoparticles, one-dimensional nanostructures (nanotubes, nanorods, nanowires), thin films, nanoporous materials, and nanostructured bulk materials,

		CO3: To criticize the importance of various instrumentation techniques such as NMR, IR, UV, X-ray diffraction, ESR etc., for elucidating the structures of nanomaterials. CO4: To depict the structure of carbonnanostructures, organic nanopolymers and supra molecular structures CO5: To recognize the important role of nanomaterials in various fields.
19PG3CE2	BIO-ORGANIC CHEMISTRY	CO1: Understand concepts of molecular recognition and drug design CO2: Remember the synthesis and structure of Proteins and amino acids. CO3: Know the extraction and purification of enzymes and their application in catalysis. CO4: Categorize and analyze enzyme mechanisms. CO5: Analyze the structure and biological functions of Coenzymes.
19PG3C14	Physical Chemistry Practicals-I	CO1: Developed expertise relevant to the professional practice of chemistry CO2: Developed an understanding of the breadth and concepts of physical chemistry CO3: An appreciation of the role of physical chemistry in the

		chemical sciences and engineering CO4: Developed an understanding of the role of the chemist and chemical engineer in tasks employing physical chemistry CO5: An understanding of methods employed for problem solving in physical chemistry
19PG3SICI	Internship	CO1: To carry out scientific experiments CO2: To accurately record and analyze the results of such experiments.
19PG4C15	Inorganic Chemistry-Iii	CO1: Illustrate the structure and mode of bonding in organometallic complexes CO2: Apply the different electron counting procedures to predict the shape and stability of organometallic complexes CO3: Illustrate the mechanism of dioxygen binding in various oxygen carrier proteins CO4: Classify and identify the different types of metalloenzymes and metallo proteins based on their biological functions. CO5: Interpret the structure of borazines, boranes and carboranes.

19PG4C16	Organic Chemistry-IV	CO1: To differentiate the carbon –carbon bond forming reactions and to interpret the products and to explore reactivity patterns of various coupling reactions CO2: To elucidate the structural units of quinine, morphine, ⟨-pinene and ⟨-codinene CO3: To correlate the skeletal units of nucleotides and nucleosides- RNA and DNA CO4: To categorize the reducing and oxidizing agents and its applications. CO5: To Sketch the effective and logical synthetic route for the synthesis of new molecules
19PG4C17	PHYSICAL CHEMISTRY-IV	CO1: Describe the structure and mode of bonding in organometallic complexes containing carbonyls, nitrosyls, carbenes, carbynes, alkenes, alkynes and also metallocene complexes CO2: Apply different electron counting procedures to predict the shape and stability of organometallic complexes CO3: Illustrate the mechanism of dioxygen binding in various oxygen carrier proteins CO4: Classify different types of metalloenzymes and metallo proteins based on their biological functions.

		CO5: Distinguish whether the given compound belongs to chain or ring or cage or cluster
19PG4CE3	ANALYTICAL CHEMISTRY	CO1: To acquire the complete knowledge of C language CO2: To develop logics which will help them to create programs, applications of chemistry problems in C. CO3: To explicate the theoretical principles of selected instrumental methods within electro analytical and spectrometric/spectrophotometric methods, and main components in such analytical instruments. CO4: To explain the confidence level and confidence limit, the sources of random errors and effects of random errors on analytical results. CO5: To illuminate the theoretical principles of various separation techniques in chromatography, and typical applications of chromatographic techniques
19PG4CE4	CHEMICAL ENGINEERING	CO1: To write C- Program using various features of C- language CO2: To categorize the various conditioning methods in water treatment CO3: To apply the principles involved in spectrophotometric analysis. CO4: To compare the mechanism between dry corrosion and wet

		corrosion CO5: To synthesize some industrially important polymers
19PG4C18	PHYSICAL CHEMISTRY PRACTICALS- II	CO1: Experience in some scientific methods employed in basic and applied physical chemistry CO2: Developed skills in procedures and instrumental methods applied in analytical and practical tasks of physical chemistry CO3: Developed skills in the scientific method of planning, developing, conducting, reviewing and reporting experiments CO4: Developed some understanding of the professional and safety responsibilities residing in working with chemical systems.
19PG4CPR	PROJECT	CO1: To carry out scientific experiments CO2: To accurately record and analyze the results of such experiments.